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EXAMINER	
ANDERSON, DENISE R	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,350	ZUBACK, JOSEPH EDWARD	
	Examiner	Art Unit	
	Denise R. Anderson	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-7,10-15,17-20,25 and 28-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-7,10-15,17-20,25 and 28-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Objections

2. Claim 29 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

3. Claim 29 is an apparatus claim and shown below.

> *Claim 29. (Previously presented) The system according to claim 28 wherein the chemical agents are selected from the group consisting of chlorination agents, fluorination agents, ozonation agents, disinfecting agents, scale control treatment agents, water softening agents, peroxide, sulfite/bisulfite, and combinations thereof.*

The material worked upon, such as the chemical agents recited above, does not limit an apparatus claim, like claim 29. As stated in MPEP 2115[R-2], "'Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim.' *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, '[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims.' *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963))."

Claim Rejections - 35 USC § 112

4. Applicant cancelled claims 21-23. The previous rejections under 35 U.S.C. 112, second paragraph, are withdrawn.

5. Applicant amended claim 34 such that the previous rejections under 35 U.S.C. 112, second paragraph, are withdrawn.

Claim Rejections - 35 USC § 103
Bray Is the Primary Reference

6. Applicant amended claims 1, 20, and 25 to recite that the backwash for the primary microfiltration or ultrafiltration unit is provided by the secondary microfiltration or ultrafiltration membrane filter. As such, the rejections under 35 U.S.C. 103(a) as being unpatentable over Bray, in view of Al-Samadi, have been withdrawn.

Detailed Claim Rejections - 35 USC § 103
Daly et al. Is the Primary Reference

7. Method claims 1, 3-7, 10, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996).

8. Method claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996).

9. Apparatus claims 25 and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996).

10. Claims 11-15, 19, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798), as applied to claims 1 and 25 above, and further in view of the Water Encyclopedia (Jay Lehr, editor, John Wiley & Sons, Inc., New York, 2005) for the recited water treatments.

11. Method claims 1, 3-7, 10, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996). The claims appear below in italics with the prior art and examiner's comments in normal font.

Claim 1. (Currently Amended) A method of purifying impure water (Daly et al., Abstract, line 1; Figure) *contaminated with a filterable impurity and a dissolved impurity, the method comprising the steps of:*

providing the impure water (Daly et al., Figure, water 8) *to a primary microfiltration or ultrafiltration unit* (Daly et al., Figure, microfilter 20) *to remove the filterable impurity and produce impure filtered water contaminated with the dissolved impurity* (Daly et al., Figure, water is introduced to the ultrafiltration unit through pipe 11 using pumping system 2 that has a feed pump and a raw water pump; Column 4, lines 11-14)*;*

providing the impure filtered water contaminated with the dissolved impurity to a reverse osmosis unit (Daly et al., Figure, reverse osmosis unit 70) *to produce a potable water stream* (Daly et al., Figure, line 76; Column 6, lines 38-40 and 51-53 where it is stated that the storage tank 80 stores potable water) *and a residual reverse osmosis stream* (Daly et al., Figure, line 82; Column 6, lines 28-38 where it is stated that impure filtered water is provided through lines 26, 35, 36, 37, 52, and 62 using process pumps 50 and 60)*;*

filtering the residual reverse osmosis stream by passing the stream through a secondary microfiltration or ultrafiltration membrane filter (Daly et al., Figure, microfilter 54; Column 7, lines 9-12, during backwash "pump 50 draws retentate from CIP tank 100 along line 104 through valve 44 (now open) along line 52 and into line 112, including quick-disconnect hose 113") *to produce filtered saline solution* (Daly et al., Column 3, lines 33-34 where it is taught that the "impure water source can include diverse water sources, including sea water"); *and*

backwashing the primary microfiltration or ultrafiltration unit (Daly et al., Figure, microfilter 20) *with the filtered saline solution* (Daly et al., Figure, microfilter 54 is secondary filter providing filtrate; Column 7, lines 9-15, during backwash "pump 50 draws retentate from CIP tank 100 along line 104 through valve 44 (now open) along line 52 and into line 112, including quick-disconnect hose 113. On backflush, the retentate is directed through valve 42 (now open) through lines 36 and 26. The retentate enters the inside of tubular membrane 22 and dislodges foulants from the membranes.").

As was stated in the previous section, Daly et al. discloses the claimed invention except that it is not explicitly stated that the secondary filter is a membrane filter. Al-Samadi et al. teaches this in the context of "Microfiltration Enhanced Reverse Osmosis for Water Treatment." Al-Samadi et al., Title. In Figure 1, Al-Samadi et al. discloses upgrading the residual reverse osmosis stream (line 18 out of the high pressure side 20 of RO membrane chamber 14) by pH adjustment or chemical oxidant "seed" adjustment. The stream enters a heat exchanger 26 and then is further filtered by an ultrafiltration or microfiltration or cartridge filter (applicant's secondary filter), before being recycled to the container 2. Al-Samadi et al. further discloses, "In FIG. 1, there is provided a container 2 into which waste water stream 4 is introduced. If stream 4 contains suspended solids, a prefiltration device such as an MF membrane, sand-bed filtration with or without flocculent addition, dead-end cartridge filtration or a combination of these may be used to remove the suspended solids that may foul the RO membrane. In this process, an antiscalant 6 may be introduced to container 2, if desired." To recap, Al-Samadi et al. discloses a primary filter prior to a reverse osmosis unit. The residual reverse osmosis stream is chemically treated and filtered with a secondary filter, prior to recycling.

Daly et al. discloses the claimed invention except that the secondary filter is not explicitly the recited membrane filter. Al-Samadi et al. discloses this. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the Daly et al. filter a membrane filter, as taught by Al-Samadi et al., since Al-

Samadi et al. states in the Abstract that such a modification would aid in provide "an improved method for extending the useful life of a reverse osmosis membrane."

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all claim 1 limitations.

Claim 3. (Currently Amended) The method according to claim 1 wherein the secondary microfiltration or ultrafiltration membrane filter is backwashed.

Claim 4. (Currently Amended) The method according to claim 1 wherein the secondary microfiltration or ultrafiltration membrane filter is a cartridge filter.

Claim 5. (Currently Amended) The method according to claim 4 wherein the secondary microfiltration or ultrafiltration membrane filter is backwashed.

Daly et al., in view of Al-Samadi et al., discloses claim 1. Daly et al. further teaches that the primary microfiltration or ultrafiltration units are backwashed to clean them. Daly et al., Figure, Column 7, lines 13-15. Thus, Daly et al. implies backwashing the secondary filter that is a microfiltration filter and appears as reference number 54 in the Figure. It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Daly et al. method, to backwash the secondary filter, as taught by Daly et al. for the primary microfiltration or ultrafiltration units, since such a modification would clean the secondary filter.

Daly et al., in view of Al-Samadi et al., discloses claim 1. Al-Samadi et al. further teaches that the secondary filter (filter 24) is an ultrafiltration / microfiltration cartridge filter in Figure 1. It would have been obvious to one having ordinary skill in the art at the

time the invention was made to have made the Daly et al. secondary filter a cartridge filter as taught by Al-Samadi et al., since Al-Samadi et al. states at Column 5, lines 50-53 that such a modification "provides a substantially precipitate or solid particle-free filtrate in low pressure side 30" of the secondary filter 24.

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all limitations recited in claims 3-5.

Claim 6. (Previously Presented) The method according to claim 1 wherein the impure water is sea water.

Claim 7. (Previously Presented) The method according to claim 1 wherein the filterable impurity includes those typically found in sea water.

Claim 10. (Previously Presented) The method according to claim 1 wherein the dissolved impurity includes sodium ions and chloride ions.

Daly et al., in view of Al-Samadi et al., discloses all claim 1 limitations. Daly et al. further teaches that the "impure water source can include diverse water sources, including sea water." Daly et al., Column 3, lines 33-34. Sea water contains sodium ions and chloride ions.

Claim 17. (Currently Amended) The method according to claim 1 wherein the step of filtering comprises filtering using multiple stages of filtration.

Daly et al., in view of Al-Samadi et al., discloses the claimed invention except that the Daly et al. secondary filter (Figure, microfilter 54) is a single stage. It would have

been obvious to one having ordinary skill in the art at the time the invention was made to have made the Daly et al. secondary filter multiple stages instead of a single stage, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

A second argument can be made. Claim 17 recites multiple stages of filtration within the secondary filter. Daly et al. discloses the claimed invention except that the secondary filter (Figure, microfilter 54) is a single stage. In Figure 1, Al-Samadi et al. teaches a two stage secondary filter in the form of the ultrafiltration / microfiltration cartridge filter 24 and the solids separation unit 34. Al-Samadi et al. further teaches, "Solid separator 34 can comprise any means such as a filter press, a hydroclave, a cartridge or rollers that squeeze liquid from the solid particles through a filter cloth. The solids may conveniently be disposed of as filter cake, and liquid removed therefrom can be recirculated along line 36 to be reintroduced to container 2." It would have been obvious to one having ordinary skill in the art at the time the invention was made to have substituted the Daly et al. single stage secondary filter with a multiple stage filter [claim 17], as taught by Al-Samadi et al., since Al-Samadi et al. states at Column 5, lines 6-10, that with such a modification, "[R]egardless of the feedstock, very high levels of liquid recovery can be obtained. That is, the system in accordance with the present invention can permit 70% to 80% and even 90% to 99% recovery of liquid or wastewater entering container 2."

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all claim 17 limitations.

Claim 18. (Currently Amended) The method according to claim 17 wherein the step of filtering comprises filtering through a coarse filter prior to filtering through the secondary microfiltration or ultrafiltration membrane filter.

Daly et al., in view of Al-Samadi et al., discloses all claim 17 limitations. Daly et al. further teaches a course filter (Figure, strainer 6) prior to filtering through a secondary filter (Figure, microfilter 54).

12. Method claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996).

Claim 20. (Currently Amended) A method of facilitating the purification of impure water (Daly et al., Abstract, line 1; Figure)*, the method comprising the steps of;*

providing a primary microfiltration or ultrafiltration unit (Daly et al., Figure microfilter 20)*;*

providing a reverse osmosis unit (Daly et al., Figure, reverse osmosis unit 70) *in downstream fluid communication from said primary microfiltration or ultrafiltration unit* (Daly et al., Figure, microfilter 20; Column 6, lines 28-38 where it is stated that impure filtered water is provided through lines 26, 35, 36, 37, 52, and 62 using process pumps 50 and 60)*;*

providing a secondary microfiltration or ultrafiltration unit (Daly et al., Figure, microfilter 54; Column 7, lines 9-12, during backwash "pump 50 draws retentate

from CIP tank 100 along line 104 through valve 44 (now open) along line 52 and into line 112, including quick-disconnect hose 113") *to produce a filtered saline solution* (Daly et al., Column 3, lines 33-34 where it is taught that the "impure water source can include diverse water sources, including sea water"); *and*

providing a controllable fluid pathway (Daly et al., Figure, Column 6, line 66 through Column 7, line 16) *for directing the filtered saline solution to backwash said microfiltration or ultrafiltration unit* (Daly et al., Figure, Column 6, lines 48-67 which states that the treated residual reverse osmosis stream 94 is stored in the CIP tank 100 for reuse as backwash for the tubular membranes 22 in the primary microfiltration or ultrafiltration unit 20; Column 7, lines 12-16 where it is stated, "Instead of drawing water from membranes 22, pump 50 draws retentate [applicant's filtered residual reverse osmosis feed] from CIP tank 100 along line 104, thorough valve 44 (now open) , along line 52 and into line 112, including quick-disconnect hose 113. On backflush, the retentate is directed through valve 42 (now open) through lines 36 and 26. The retentate enters the inside of tubular membranes 22 [part of applicant's microfiltration or ultrafiltration unit that Daly labels as reference number 20] and dislodges foulants from the membranes. Backflushing may be programmed at any desired interval for any desired period.")

As with claim 1, Daly et al. discloses the claimed invention except that it is not explicitly stated that the secondary filter is a membrane filter. Al-Samadi et al. discloses this. It would have been obvious to one having ordinary skill in the art at the time the

invention was made to have made the Daly et al. filter a membrane filter, as taught by Al-Samadi et al., since Al-Samadi et al. states in the Abstract that such a modification would aid in provide "an improved method for extending the useful life of a reverse osmosis membrane."

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all claim 20 limitations.

13. Apparatus claims 25 and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798, Mar. 26, 1996).

Claim 25. (Currently Amended) A system for purifying impure water (Daly et al., Abstract, line 1; Figure) *contaminated with a filterable impurity and a dissolved impurity, comprising:*

a primary microfiltration or ultrafiltration unit (Daly et al., Figure, microfilter 20) *to remove the filterable impurity;*

a reverse osmosis unit (Daly et al., Figure, reverse osmosis unit 70) *to produce a potable water stream* (Daly et al., Figure, line 76; Column 6, lines 38-40 and 51-53 where it is stated that the storage tank 80 stores potable water) *and a residual reverse osmosis stream* (Daly et al., Figure line 94),

said reverse osmosis unit (Daly et al., Figure, reverse osmosis unit 70) *in downstream fluid communication from said primary microfiltration or ultrafiltration unit* (Daly et al., Figure, microfilter 20; Column 6, lines 28-38 where it is stated that

impure filtered water is provided through lines 26, 35, 36, 37, 52, and 62 using process pumps 50 and 60)*;*

a controllable fluid pathway (Daly et al., Figure, Column 6, line 66 through Column 7, line 16) *to transfer a stream of impure filtered water contaminated with a dissolved impurity from the primary microfiltration or ultrafiltration unit to the reverse osmosis unit* (Daly et al., Figure, microfilter 20 and reverse osmosis unit 70; Column 6, lines 28-38 where it is stated that impure filtered water is provided through lines 26, 35, 36, 37, 52, and 62 using process pumps 50 and 60)*;*

a secondary microfiltration or ultrafiltration membrane filter (Daly et al., Figure, microfilter 54; Column 7, lines 9-12, during backwash "pump 50 draws retentate from CIP tank 100 along line 104 through valve 44 (now open) along line 52 and into line 112, including quick-disconnect hose 113") *to filter the residual reverse osmosis stream to produce a filtered saline solution* (Daly et al., Column 3, lines 33-34 where it is taught that the "impure water source can include diverse water sources, including sea water")*; and*

a controllable (Daly et al., Figure, Column 6, line 66 through Column 7, line 16) *fluid pathway directing the filtered saline solution to backwash the primary microfiltration or ultrafiltration unit.*

As with claims 1 and 20, Daly et al. discloses the claimed invention except that it is not explicitly stated that the secondary filter is a membrane filter. Al-Samadi et al. discloses this. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the Daly et al. filter a membrane filter, as

taught by Al-Samadi et al., since Al-Samadi et al. states in the Abstract that such a modification would aid in provide "an improved method for extending the useful life of a reverse osmosis membrane."

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all claim 25 limitations.

Claim 28. (Previously Presented) The system according to claim 25 further comprising one or any combination of ports for the introduction of chemical agents, irradiation means, ultrasonic generators, vortexing devices, heating elements, electroprecipitators and magnets.

Claim 29. (Previously Presented) The system according to claim 28 wherein the chemical agents are selected from the group consisting of chlorination agents, fluorination agents, ozonation agents, disinfecting agents, scale control treatment agents, water softening agents, peroxide, sulfite/bisulfite, and combinations thereof.

Claim 30. (Currently Amended) The system according to claim 25 for purifying impure water contaminated with a filterable impurity and a dissolved impurity further comprising: a conduit to transfer a residual reverse osmosis stream from the reverse osmosis unit to backwash the primary microfiltration or ultrafiltration unit via the secondary microfiltration or ultrafiltration unit.

Claim 31. (Currently Amended) The system according to claim 25 wherein the secondary microfiltration or ultrafiltration unit is a backwashable or disposable cartridge microfiltration or ultrafiltration system.

Claim 34. (Previously presented) The system according to claim 25 wherein the residual reverse osmosis stream is in controllable fluid communication with coarse backwashable filters such as single or multimedia filters, disc filters, diatomaceous earth filters, membrane filters, strainers, or screens.

Daly et al., in view of Al-Samadi et al., discloses or suggests all claim 25 limitations. Daly et al. further discloses that the apparatus have ports [claims 28 and 29]. Note that the material being worked upon, as recited in claim 29, does not limit apparatus claims. As stated in MPEP 2115, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d *>996<, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

In the Figure, Daly et al. further teaches the conduit recited in claim 30. As shown in the claims 4 and 5 patentability analyses, the Daly et al. filter is a backwashable cartridge filter [claim 31]. As shown in the claim 18 patentability analysis and in the Figure, the Daly et al. reverse osmosis unit (reverse osmosis unit 70) is in fluid communication with the coarse filter (strainer 6) [claim 34].

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all limitations recited in dependent claims 28-31 and 34.

Claim 32. (Currently Amended) The system according to claim 25 wherein the secondary microfiltration or ultrafiltration unit comprises multiple stages of filtration.

Claim 33. (Currently Amended) The system according to claim 32 wherein the multiple stages of filtration include a first filtration through a coarse filter prior to filtration through the secondary microfiltration or ultrafiltration membrane filter.

Daly et al., in view of Al-Samadi et al., discloses the claimed invention except that the Daly et al. secondary filter (Figure, microfilter 54) is a single stage. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the Daly et al. secondary filter multiple stages [claim 32] instead of a single stage, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

A second argument can be made. Claim 32 recites multiple stages of filtration within the secondary filter. Daly et al. discloses the claimed invention except that the secondary filter (Figure, microfilter 54) is a single stage. In Figure 1, Al-Samadi et al. teaches a two stage secondary filter in the form of the ultrafiltration / microfiltration cartridge filter 24 and the solids separation unit 34. Al-Samadi et al. further teaches, "Solid separator 34 can comprise any means such as a filter press, a hydroclave, a cartridge or rollers that squeeze liquid from the solid particles through a filter cloth. The solids may conveniently be disposed of as filter cake, and liquid removed therefrom can be recirculated along line 36 to be reintroduced to container 2." It would have been obvious to one having ordinary skill in the art at the time the invention was made to have

substituted the Daly et al. single stage secondary filter with a multiple stage filter [claim 17), as taught by Al-Samadi et al., since Al-Samadi et al. states at Column 5, lines 6-10, that with such a modification, "[R]egardless of the feedstock, very high levels of liquid recovery can be obtained. That is, the system in accordance with the present invention can permit 70% to 80% and even 90% to 99% recovery of liquid or wastewater entering container 2."

As shown in the claim 18 patentability analysis and in the Figure, the Daly et al. reverse osmosis unit (reverse osmosis unit 70) is in fluid communication with the coarse filter (strainer 6) [claim 34].

In summary, Daly et al., in view of Al-Samadi et al., discloses or suggests all limitations recited in dependent claims 33 and 34.

14. Claims 11-15, 19, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly et al. (Patent No. 6,120,688, Sept. 19, 2000), in view of Al-Samadi et al. (US Patent No. 5,501,798), as applied to claims 1 and 25 above, and further in view of the Water Encyclopedia (Jay Lehr, editor, John Wiley & Sons, Inc., New York, 2005) for the recited water treatments.

15. Applicant recites further treating a water stream, specifically the residual reverse osmosis stream, prior to reuse. In what follows, Daly et al., in view of Al-Samadi et al., discloses the claimed invention. In Figure 1, Al-Samadi et al. further teaches treating the residual reverse osmosis stream. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have treated the Daly et al. residual reverse osmosis stream, as taught by

Al-Samadi et al., since Al-Samadi et al. states in the Abstract, lines 1-2 that such a modification "is an improved method for extending the useful life of a reverse osmosis membrane."

16. Water treatment is an old science, as evidenced by the five volumes in the Water Encyclopedia. The approach taken to the patentability analysis below is that Daly et al., in view of Al-Samadi et al. discloses the method of claim 1 and some of the various recited chemical treatments, radiation treatments, and physical treatments. The remaining treatments are taught in the Water Encyclopedia to further purify or enhance the residual reverse osmosis stream prior to reuse in the Daly et al. method. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply needed treatments to the residual reverse osmosis stream in the Daly et al. method, as taught by the Water Encyclopedia, because such modifications would further purify or enhance the residual reverse osmosis stream prior to reuse.

Claim 11. (Previously Presented) The method according to claim 1 further comprising treating the residual reverse osmosis stream prior to backwashing by one or more of a chemical treatment, a radiation treatment or a physical treatment.

Daly et al., in view of Al-Samadi et al., discloses the claimed invention. In Figure 1, Al-Samadi et al. teaches a chemical treatment (chemical oxidant seed addition) and a physical treatment (filtering). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have chemically or physically treated the Daly et al. residual reverse osmosis stream, as taught by Al-Samadi et al., since Al-Samadi et al. states in the Abstract that such a modification would aid in provide "an improved method for extending the useful life of a reverse osmosis membrane."

A second argument can be made. Daly et al., in view of Al-Samadi et al., discloses the claimed invention. The Water Encyclopedia further teaches chlorination (a chemical treatment), ultraviolet or UV treatment (a radiation treatment) and ultrasonication (a physical treatment).

The Water Encyclopedia teaches a chemical treatment. One such chemical treatment is chlorination where "chlorine is added to water to kill disease-causing bacteria, parasites, and other organisms." Water Encyclopedia, Chlorination, 2:88, Introduction, ¶ 1.

The Water Encyclopedia teaches a radiation treatment. One such radiation treatment is UV light that is used as "a reliable means of disinfection." Water Encyclopedia, Ultraviolet Disinfection, 1:466, What is UV Disinfection? ¶ 1.

Finally, the Water Encyclopedia teaches a physical treatment to purify water – namely ultrasonication or ultrasonic irradiation. In this treatment, water is irradiated with ultrasonic waves that heat up small water pockets to the point of vaporization. This is known as "cavitation" which "may function as a microreactor" to either destroy "volatile organic compounds inside" or serve as a "H*, OH*, OOH* radical source that may react with pollutants in the bulk of solution." Water Encyclopedia, Waste Treatment Techniques – Advanced, 1:875, Ultrasonic Irradiation, ¶ 1 and Figure 7.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to treat the residual reverse osmosis stream, if needed, by one or more chemical treatments, radiation treatments, or physical treatments, as taught by the

Water Encyclopedia, because such a modification would either enhance or purify the water before reuse.

In summary, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all claim 11 limitations.

Claim 12. (Previously Presented) The method according to claim 11 wherein the chemical treatment is selected from the group consisting of chlorination, fluorination, disinfection, scale control treatment, water softening, peroxide, sulfite/bisulfite, ozone and combinations thereof.

Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses all claim 11 limitations. The Water Encyclopedia further teaches:

Chlorination where "chlorine is added to water to kill disease-causing bacteria, parasites, and other organisms." Water Encyclopedia, Chlorination, 2:88, Introduction, ¶ 1.

Fluoridation where fluoride is added to community water supplies to prevent tooth decay. Water Encyclopedia, Fluoridation, 1:254, ¶ 1.

Scale control treatment where chemicals are added to solubilize calcium carbonate $CaCO_3$ and prevent it from scaling out on equipment – which causes equipment operating problems. Water Encyclopedia, Industrial Cooling Water – Scale Formation, 1:547-548, Scaling Control, ¶ 1.

Water softening where either hydrated lime [$Ca(OH)_2$] or quicklime (CaO) are added to the water to improve the quality for domestic use, i.e. reduce scale in water

heaters or allow soap to lather well. Water Encyclopedia, Lime Softening, 1:322, ¶ 1.

Peroxide as an alternative disinfection method to chlorination. Water Encyclopedia, Threat Agent and Water Biosecurity, 1:88, Survival of Threat Agents in Water, last paragraph.

Sulfite / bisulfate for the dechlorination of water. Water Encyclopedia, Dechlorination, 1:169, ¶ 2.

Ozone as a "powerful oxidizing and disinfecting agent" and as one of the treatment "technologies for small drinking water systems." Water Encyclopedia, Treatment for Technologies for Small Drinking Water Systems, 1:458, paragraph entitled "Ozonation."

It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Daly et al. method, to treat the residual reverse osmosis stream, if needed, by one or more chemical treatments from the list of chlorination, fluorination, disinfection, scale control treatment, water softening, peroxide, sulfite/bisulfite, or ozone, as taught by the Water Encyclopedia, because such modifications would enhance the water before reuse.

In summary, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all claim 12 limitations.

Claim 13. (Previously Presented) The method according to claim 11 wherein the

radiation treatment is selected from the group consisting of UV, IR, microwave and combinations thereof.

Daly et al., in view of the Water Encyclopedia, discloses all claim 11 limitations. The Water Encyclopedia further teaches:

UV irradiation as "a reliable means of disinfection." Water Encyclopedia, Ultraviolet Disinfection, 1:466, What is UV Disinfection? ¶ 1.

Heat can be used to purify water via vaporization. Water Encyclopedia, Wastewater Treatment and Recycling Technologies, 1:813, Thermal Technologies - Distillation, ¶ 1. Both IR and microwave irradiation can serve as heat sources.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Daly et al. method, to treat the residual reverse osmosis stream, if needed, by one or more radiation treatments from the list of UV, IR and microwave, as taught by the Water Encyclopedia, because such modifications would enhance the water or purify it before reuse.

In summary, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all claim 13 limitations.

Claim 14. (Previously Presented) The method according to claim 11 wherein the physical treatment is selected from the group consisting of ultrasonication, vortexing, and combinations thereof.

Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses all claim 11 limitations. The Water Encyclopedia further teaches:

Ultrasonication where water is irradiated with ultrasonic waves that heat up small water pockets to the point of vaporization. This is known as "cavitation" which "may function as a microreactor" to either destroy "volatile organic compounds inside" or serve as a "H*, OH*, OOH* radical source that may react with pollutants in the bulk of solution." Water Encyclopedia, Wastewater Treatment Techniques – Advanced, 1:875, Ultrasonic Irradiation, ¶ 1 and Figure 7.

Vortexing where solids are separated from sewage water. Water Encyclopedia, Combined Sewer Overflow Treatment, 1:784, Physical Treatment – Swirl/Vortex Technologies, ¶ 1, Figure 3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Daly et al. method, to treat the residual reverse osmosis stream, if needed, by one or more physical treatments from the list of ultrasonication or vortexing, as taught by the Water Encyclopedia, because such modifications would enhance or purify the water before reuse.

In summary, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all claim 14 limitations.

Claim 15. (Currently Amended) The method according to claim 11 wherein the treatment is selected from the group consisting of heat, electroprecipitation, magnetic treatments and combinations thereof.

Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses all claim 11 limitations. The Water Encyclopedia further teaches that:

Heat can be used to purify water via distillation. Water Encyclopedia, Wastewater Treatment and Recycling Technologies, 1:813, Thermal Technologies – Distillation, ¶ 1.

Electroprecipitation (electrolysis) can be used to deposit or decompose soluble inorganics or organics on to an electrode surface by an electrochemical redox reaction. Water Encyclopedia, Wastewater Treatment and Recycling Technologies, 1:812, Electrical Technologies – Electrolysis, ¶ 1.

Magnetic treatments can be used to control hard water scale. Water Encyclopedia, Physical Water Conditioning, 1:141, ¶ 1.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Daly et al. method to treat the residual reverse osmosis stream, if needed, by one or more treatments from the list of heat, electroprecipitation, or magnetic treatments, as taught by the Water Encyclopedia, because such modifications would enhance or purify the water before reuse.

In summary, Daly et al., in view of the Water Encyclopedia, discloses or suggests all claim 15 limitations.

Claim 19. (Previously Presented) The method according to claim 18 wherein the residual reverse osmosis stream is in controllable fluid communication with a coarse backwashable filter selected from the group consisting of a single or multimedia filter, a disc filter, a diatomaceous earth filter, a membrane filter, a strainer, a screen and combinations thereof.

Claim 34. (Previously presented) The system according to claim 25 wherein the residual reverse osmosis stream is in controllable fluid communication with coarse backwashable filters selected from the group consisting of single or multimedia filters, disc filters, diatomaceous earth filters, membrane filters, strainers, and screens.

Daly et al., in view of Al-Samadi et al., discloses all claim 18 (or claim 25) limitations including that the residual reverse osmosis stream is in controllable fluid communication with backwashable filters. Daly et al., Figure, Column 6, line 66 through Column 7, line 16. Daly et al. further discloses strainers. Daly et al., Figure, reference number 6; Column 3, lines 53-55. The Water Encyclopedia also discloses backwashable filters and further teaches single or multimedia filters, disk filters, diatomaceous earth filters, membrane filters, and screens.

Backwashable filters are used so that they can be cleaned and, thus, filtrate quality is maintained. Water Encyclopedia, Filtration Water Treatment, 1:245-246, first two paragraphs of the article.

Single or multimedia filters are used to produce clear water and to improve taste and reduce odor: Water Encyclopedia, Filtration Water Treatment, 1:245-246, first paragraph of the article and sixth paragraph of the article.

Disk filters such as are used to aerate water. These filters are often sintered ceramic plates: Water Encyclopedia, Fine Bubble Diffused Air Aeration Systems, 1:626, Figure 4 and the third paragraph of the article.

Diatomaceous earth filters are used to remove particles in the water: Water Encyclopedia, Filtration Water Treatment, 1:247, third paragraph on the page beginning with "Diatomaceous earth filtration."

Membrane filters are used to produce potable water from seawater or brackish water: Water Encyclopedia, Filtration Water Treatment, 1:247, fourth paragraph on the page beginning with "Membrane filtration."

Strainers: Daly et al., Figure, strainer 6.

Screens are used to remove solids from wastewater. Water Encyclopedia, Wastewater Treatment and Recycling Technologies, 1:809, paragraph following the title "Screening, Filtration, and Centrifugal Separation."

It would have been obvious to one having ordinary skill in the art at the time the invention was made to match the Daly et al. method with the correct filter alternative listed in the claim and taught by the Water Encyclopedia, because such a modification would achieve the design objectives for the particular situation at hand.

In summary then, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all claim 19 limitations and all claim 34 limitations.

In summary, Daly et al., in view of Al-Samadi et al., in further view of the Water Encyclopedia, discloses or suggests all limitations recited in dependent claims 19 and 34.

Response to Arguments

17. Applicant's arguments filed March 16, 2009 have been fully considered but they are not persuasive.

18. Applicant's arguments are listed below, with the examiner's response following.

a. Regarding independent claims 1, 20, and 25, applicant argues, "One skilled in the art would not have been motivated to combine the teaching of Daly with the teaching of A1-Samadi" because "Daly emphasizes the technique of backwashing the microfiltration unit" and "the teaching of A1-Samadi does not disclose any backwashing of the filtration system." Applicant continues, "One of ordinary skill in the art using backwashing techniques to clean or unclog a microfiltration unit and increase the life of the membrane would not have looked to a teaching that uses precipitating agents, antiscalants and solubilizing agents to prevent fouling and scaling of the filters." Applicant's Remarks, p. 9, lines 24-25; p. 10, lines 1-7.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have substituted the Daly et al. conventional cartridge filter with a membrane filter, as taught by Al-Samadi et al., since Al-Samadi et al. states in the Abstract that such a modification would aid in providing "an improved method for extending the useful life of a reverse osmosis membrane."

b. Regarding independent claims 1, 20, and 25, applicant argues, "[T]he Declaration of Joseph Edward Zuback," the inventor, states that "the purpose of the ten micron filter of Daly is to protect the reverse osmosis membrane(s)" and "Daly does not recognize or even acknowledge that materials may originate or be formed within the reverse osmosis membrane modules." Applicant's Remarks, p. 10, lines 13-17.

In response to applicant's argument that Daly et al. put in the secondary microfiltration or ultrafiltration filter for another reason, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

c. Regarding independent claims 1, 20, and 25, applicant argues, "[T]he Declaration of Joseph Edward Zuback," the inventor, states that "the ten micron filter of Daly is not equivalent and cannot operate as the secondary microfiltration or ultrafiltration membrane filter as presently claimed" because "the ten micron filter is too course to perform this function."

The examiner responds as in the above patentability analysis. Daly et al. discloses the claimed invention except that the secondary filter is not the explicitly recited membrane filter. Al-Samadi et al. teaches this. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made

the Daly et al. filter a membrane filter, as taught by Al-Samadi et al., since Al-Samadi et al. states in the Abstract that such a modification would aid in providing "an improved method for extending the useful life of a reverse osmosis membrane."

d. Regarding claims 11-15, 19 and 34 and the Water Encyclopedia reference, applicant argues, "The various chemical, radiation, and physical treatments taught in Encyclopedia are intended to further purify the stream to provide drinkable water. One of ordinary skill in the art looking to use a feed stream or reverse osmosis retentate to backwash a microfiltration unit as in . . . Daly, would not have been motivated to treat the retentate to purify and enhance it." Applicant's Remarks, p. 11, lines 25-29.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Daly et al., in view of Al-Samadi et al. discloses the method of claim 1 and some of the various recited chemical treatments, radiation treatments, and physical treatments. The remaining treatments are taught in the Water Encyclopedia to further purify or enhance the residual reverse osmosis stream prior to reuse in the Daly et al. method.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply needed treatments to the residual reverse osmosis stream in the Daly et al. method, as taught by the Water Encyclopedia, because such modifications would further purify or enhance the residual reverse osmosis stream prior to reuse.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references disclose treating the retentate and returning it to the process. The last three references teach that the treated retentate is returned to use as backwash for the primary microfiltration or ultrafiltration backwash.

Document ID	Date	Inventor	Classification
US 3795609 A	03/05/1974	SCOTT R et al.	210/636
US 4105556 A	08/08/1978	O'Amaddio; Eugene R. et al.	210/206
US 6349835 B1	02/26/2002	Saux; Franc et al.	210/427
US 20030196955 A1	10/23/2003	Hughes, Kenneth D.	210/650

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

21. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise R. Anderson whose telephone number is (571)270-3166. The examiner can normally be reached on Monday through Thursday, from 8:00 am to 6:00 pm.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DRA/

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797